

PATENT ABSTRACTS OF JAPAN

(11)Publication number : **11-017770**

(43)Date of publication of application : **22.01.1999**

(51)Int.Cl. **H04L 29/08**

H04Q 7/38

H04L 29/06

(21)Application number : **09-168881**

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(22)Date of filing : **25.06.1997**

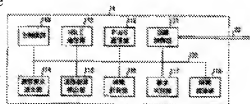
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(54) COMMUNICATION EQUIPMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To establish the links of plural kinds of communication systems with one device and to communicate data irrespective of the communication system of an opposite party, by detecting a communication request from the opposite party, discriminating the communication system of the opposite party based on this detected result and adaptively establishing the link to data communication in 1st and 2nd communication systems.

SOLUTION: A communication request sending part 114 of a communication equipment sends the HDLC or PIAFS communication request signal of a designated system through a line control part 111 and a communication line 20 to an opposite party, and a communication request detecting part 115 detects the HDLC or PIAFS communication request signal sent from the opposite party through the communication line 20 and the line control part 111. Besides, a main control part 119 controls the switching of the communication request sending part 114 and the communication request detecting part 115, corresponding to the communication system of the opposite party in response to the results of discrimination due to a request discriminating part 117 and a time over part 118.



DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the communication apparatus for performing the

data communications which have two different establishes synchronization sequences.

[0002]

[Description of the Prior Art]In recent years, various mobile communication systems are developed with development of communication technology, and expansion of communication needs, and the digital cordless telephone device called as one PHS (Personal Handy Phone System) exists. In this PHS. They are for example, a HDLC (High Level Data Link Control) communication method and PIAFS (PHS Internet Access Forum Standard) as data communications of a 32K bps non-digital bearer. The communication method etc. are applied.

[0003]There is no distinction of an initiator and an initiator in the linkup sequence of this HDLC communication method, and the link is established because an initiator and an initiator send out and detect a flag (FLG) pattern mutually. A sequence is shown below.

- (1) Both an initiator and / initiator send out the FLG pattern equivalent to needed information.
- (2) If the FLG pattern from the other party is detectable, transmit the CONNECT frame.
- (3) It is linkup completion when the CONNECT frame from the other party is receivable.

[0004]On the other hand, the linkup sequence of a PIAFS communication method has distinction of an initiator and an initiator, the initiator detected the synchronous request frame from an initiator, and the link is established by sending out this synchronous request frame to an initiator. A sequence is shown below.

- (1) An initiator transmits the synchronous request frame equivalent to needed information.
- (2) An initiator transmits a synchronous request frame, after receiving the synchronous request frame from an initiator.
- (3) An initiator receives a synchronous request frame and it is linkup completion.

[0005]By the way, although there are various kinds of communication methods with which establishes synchronization sequences differ as mentioned above, a communication apparatus which is different for every communication method, respectively realizes. For this reason, when a communication apparatus is connected to the circuit with which two or more kinds of communication methods coexist, the inconvenience that only one of communication methods can respond has arisen.

[0006]

[Problem(s) to be Solved by the Invention]As mentioned above, in the conventional communication apparatus, since the device for exclusive use has realized various kinds of communication methods with which establishes synchronization sequences differ, respectively, when it is connected to the circuit with which two or more kinds of communication methods coexist, it has the inconvenience that only one of communication methods can respond.

[0007]The purpose of this invention realizes the linkup of two or more kinds of communication methods with one device, and there is in providing the communication apparatus which can perform data communications regardless of a partner's communication method.

[0008] Means for Solving the Problem]The 1st communication method that establishes a link by a communication apparatus concerning this invention sending out needed information with an initiator and an initiator same to mutual, and detecting this needed information, An initiator and an initiator have different needed information from the 1st communication method, It is a device for performing

data communications which have the 2nd communication method that establishes a link by an initiator detecting this needed information from an initiator, and sending out a response to this this detected needed information to an initiator at least, A needed information delivery means which sends out needed information of data communications by the 1st or the 2nd communication method to the other party, A needed information detection means to detect needed information of data communications by the 1st or the 2nd communication method sent out from the other party, A number means of hour meters to give time restriction to operation of a needed information detection means, and a demand discriminating means which distinguishes either the 1st or the 2nd communication method based on a detection result of a needed information detection means, It judges whether the number means of hour meters exceeds the time limit, and when exceeding, it has a time [to urge needed information of the 2nd communication method to a needed information delivery means] excess means.

[0009]Since according to this composition needed information from the other party was detected and a communication method of the other party is distinguished based on this detection result, a link is establishable accommodative to data communications by the 1st communication method and 2nd communication method. Since he is trying to send out needed information of the 2nd communication method when time restriction is given to detection of needed information from the other party and the time limit is exceeded, Also to the other party of an initiator which is operating with the 2nd communication method that does not send out a response to different needed information, it changes to a partner's communication method automatically, and a link can be established.

[0010]The 1st communication method that establishes a link by a communication apparatus concerning this invention sending out needed information with an initiator and an initiator same to mutual, and detecting this needed information, An initiator and an initiator have different needed information from the 1st communication method, It is a device for performing data communications which have the 2nd communication method that establishes a link by an initiator detecting this needed information from an initiator, and sending out a response to this this detected needed information to an initiator at least, A needed information delivery means which sends out needed information of data communications by the 1st or the 2nd communication method to the other party, A needed information detection means to detect needed information of data communications by the 1st or the 2nd communication method sent out from the other party, A number means of hour meters to give time restriction to operation of a needed information detection means, and a demand discriminating means which distinguishes either the 1st or the 2nd communication method based on a detection result of a needed information detection means, Judge whether the number means of hour meters exceeds the time limit, and when exceeding, according to a discriminated result by time [to urge needed information of the 2nd communication method to a needed information delivery means] excess means, and a demand discriminating means, and a decision result by said time excess means, It has a communication method switchover control means which carries out switchover control of a needed information delivery means and the needed information detection means so that it may double with a communication method of the other party.

[0011]Since according to this composition a communication method of a self-device is changed so that needed information from the other party may be detected, a communication method of the other party may be distinguished based on this detection result and it may double with a communication method of the other party, Even if the other party supports the 1st communication method or 2nd communication

method, a link is establishable accommodative.

[0012]

[Embodiment of the Invention] Hereafter, this embodiment of the invention is described in detail with reference to Drawings. Drawing 1 shows the 1 embodiment of this invention. In drawing 1, the numerals 11 in a figure are communication apparatus, and, as for the line control part 111, the PIAFS communications department 112, the HDLC communications department 113, the needed information sending part 114, the needed information primary detecting element 115, and several copies of hour meters, are constituted by 116, the demand discrimination section 117, the time excess part 118, and the main control part 119, Each circuit is mutually connected by the control bus 120.

[0013] Among these, the line control part 111 is performing connect control with the communication line 20, etc. The PIAFS communications department 112 has a PIAFS communications protocol, and the HDLC communications department 113 has a HDLC communications protocol. Via the line control part 111 and the communication line 20, the needed information sending part 114 sends out the specified HDLC communication or the PIAFS communication request signal of a method to the other party, and the needed information primary detecting element 115, The HDLC communication or the PIAFS communication request signal sent via the communication line 20 and the line control part 111 is detected from the other party.

[0014] In several copies of hour meters, 116 measures the detection waiting time of the communication request signal from the other party, and the needed information from which the demand discrimination section 117 was detected in the needed information primary detecting element 115 performs discrimination processing of HDLC communication or PIAFS communication either. The time excess part 118 judges whether the time limit which was set up in 116 as for several copies of hour meters is exceeded, and in this time limit, when needed information from a partner cannot be detected, it is stimulating the demand of PIAFS communication to the needed information sending part 114.

[0015] The main control part 119 performs all-inclusive control of each circuit, and according to the discriminated result especially by the demand discrimination section 117, and the decision result by the time excess part 118, it is carrying out switchover control of the needed information sending part 114 and the needed information primary detecting element 115 so that it may double with the communication method of the other party.

[0016] Drawing 2 is a flow chart shown in order to explain operation of the above-mentioned main control part 119. In drawing 2, where the communication apparatus 11 and the communication apparatus of the other party are connected, it is operating.

[0017] First, the main control part 119 makes the needed information (FLG pattern) of HDLC communication send out by the needed information sending part 114, in order to show performing data communications with a HDLC communication method to the other party. The main control part 119 also makes FLG pattern detection processing and synchronous request frame reception check processing perform simultaneously in the needed information primary detecting element 115 at this time. Here, since the communication apparatus 11 performs receiving waiting of a synchronous request frame first when the other party is PIAFS communication, it becomes operation of an initiator. When the communication apparatus 11 performs the main control part 119 initiator operation of PIAFS communication, in order to make it correspond to this operation, First, the time limit until the response from [from a FLG pattern sending-out time] the other party arrives is set up, and several copies of hour

meters take out instructions to 116 so that this time may be measured (Step S31).

[0018]Next, the main control part 119 is Step S32, and makes a FLG pattern detect in the needed information primary detecting element 115. When a FLG pattern is detected (YES), here the main control part 119, A partner's communication method makes it judge it as HDLC communication by the demand discrimination section 117, at Step S33, needed information (synchronous request frame) reception check processing of PIAFS communication is stopped, and the linkup procedure of HDLC communication is advanced by Step S34.

[0019]In Step S32, when a FLG pattern is not detected, (NO) and the main control part 119 are Step S35, and they take out instructions to the needed information primary detecting element 115 so that synchronous request frame reception check processing may be performed. When a synchronous request frame is detected (YES), it makes a partner's communication method judge it as PIAFS communication (initiator) by the demand discrimination section 117 here, and at Step S36. Instructions are taken out to the needed information sending part 114 and the needed information primary detecting element 115 so that sending out and detection of a FLG pattern may be stopped, and the procedure of the linkup of PIAFS communication is advanced at Step S37. A synchronous reception frame is sent out at this time.

[0020]In Step S35, when a synchronous request frame is not detected, (NO) and the main control part 119 are Step S38, and confirm whether the timer reached the time limit. When having reached (YES), here the main control part 119, In the time excess part 118, it makes a partner's communication method judge that it is PIAFS communication (initiator), and at Step S39. Sending out and detection of a FLG pattern are stopped, instructions are taken out to the needed information sending part 114 and the needed information primary detecting element 115 so that the synchronous request frame of PIAFS communication may be sent out, and the procedure of the linkup of PIAFS communication is advanced at Step S40.

[0021]In Step S38, when not having reached the time limit, (NO) and the main control part 119 repeat and perform processing after the above-mentioned step S32. Drawing 3 - drawing 5 show the sequence at the time of combining each communication method.

[0022]Drawing 3 shows the sequence of the linkup in a HDLC communication method, and shows the case where an initiator and an initiator are the followings.

(1) An initiator is HDLC communication and an initiator is the communication apparatus 11.

[0023](2) ** / initiator is the communication apparatus 11.

(3) An initiator is the communication apparatus 11 and an initiator is HDLC communication.

In this case, since the FLG pattern of the HDLC communication from the beginning also with an initiator and an initiator is sent out, each detected the FLG pattern mutually and has established the link of HDLC communication by sending out the CONNECT frame.

[0024]As for drawing 4, the initiator shows the sequence in case PIAFS communication and an initiator are the communication apparatus 11. First, although the communication apparatus 11 which is an initiator performs FLG pattern sending out as operation of HDLC communication, since it receives the synchronous request frame of PIAFS communication from an initiator, it changes to PIAFS communication (initiator), and it operates, and establishes the link of PIAFS communication.

[0025]As for drawing 5, the initiator shows the sequence in case the communication apparatus 11 and an initiator are PIAFS communications. First, although the communication apparatus 11 which is an

initiator sends out a FLG pattern as operation of HDLC communication, there is no response from the other party and the time limit is greeted. If this time limit is exceeded, the communication apparatus 11 will change to a PIAFS communication method, will send out a synchronous request frame to the other party as initiator operation of PIAFS communication, and will establish the link of PIAFS communication. [0026]Therefore, according to the above-mentioned embodiment, by detecting the FLG pattern or synchronous request frame equivalent to the needed information from the other party, when the communication apparatus 11 is an initiator, it changes so that it may double with the communication method of the other party. When the communication apparatus 11 is an initiator, first, a FLG pattern is sent out to the other party, and by detecting the FLG pattern from the other party, it judges that the other party is HDLC communication, and doubles with a HDLC communication method. When the response waiting time from the other party exceeds the time limit by several copies of hour meters which give time restriction having 116 to the detecting operation of the needed information primary detecting element 115 when the communication apparatus 11 is an initiator, it changes to a PIAFS communication method.

[0027]For this reason, data communications can be performed, without being able to establish a link accommodative and being conscious of the communication method of a communications partner to HDLC communication and PIAFS communication. Also to the other party of the initiator which is operating with the PIAFS communication method which does not send out a response to different needed information, it changes to a PIAFS communication method automatically, and a link can be established.

[0028]Although the above-mentioned embodiment explains the example which the communication apparatus 11 sends out a FLG pattern first, and plans a linkup with the other party, it is operation of a PIAFS communication method, and even if it sends out a synchronous request frame first, a linkup with the other party can be planned. In this case, even if the other party is operating with the HDLC communication method, by sending out a FLG pattern to the communication apparatus 11, the communication apparatus 11 detects the FLG pattern from the other party, changes it to the same HDLC communication method as the other party, and realizes a linkup.

[0029]As for this invention, it is a matter of course that it changes variously and can carry out in the range which is not limited to the above-mentioned embodiment and does not deviate from the gist of this invention.

[0030]

[Effect of the Invention]As explained in full detail above, according to this invention, one device can realize the linkup of two or more kinds of communication methods, and the communication apparatus which can perform data communications regardless of a partner's communication method can be provided.